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INFORMATION ON INTERNATIONAL GEOPHYSICAL COOPERATION --

SOVIET-BLOC ACTIVITIES

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I. METEOROLOGY

The Work of the Odessa Aerological Station Described

The following paragraphs are a summarization of a 1 1/2 page article recently appearing in Meteorologiya i Gidrologiya:

The aerological observation group at the Odessa Hydrometeorological Observatory makes thrice-daily soundings of the atmosphere for the collection of data on wind and temperature. The teams of workers consist of four specialists and to insure efficiency the personnel of each team is kept constant. The distribution of labor among team members is described.

The height reached by the sounding equipment is regarded as an important factor and this height depends to a considerable extent on the manner in which the balloon's envelope is prepared. The procedure for treating and handling the envelope is described.

The envelope is examined for its external appearance (uneven thickness of the rubber, the presence of cracks, spots, etc. After this the envelope is placed in a thermostat for 6 to 8 hours at a temperature of 70-80°. It is periodically turned for even heating. After heating the envelope is immersed in kerosene. In the summer season, when the temperature of the kerosene is 20-30°, the time it is held in the kerosene is 3 to 6 minutes; this gives 6 to 10% saturation in relation to the initial weight of the envelope. In the winter season, when the temperature of the kerosene is 10-20°, the envelope is held in the kerosene for 10-15 minutes and is saturated 25-30%.

The kerosene-treated envelope is dried a little and stored at a temperature of 25-35° in summer for 1 or 2 days and in winter for 3 to 5 days. It should be noted that the optimum time for treating an envelope must be determined experimentally for each consignment of envelopes.

The envelope is filled with cold hydrogen until attaining a lifting force of about 1.9 kg (for envelope No. 100) or 2.2 kg (for No. 150). It should be remembered here that the ceiling that can be reached when using envelope No. 150 is 2-2.5 km higher than with envelope No. 100. Unfortunately No. 150 envelopes are very rarely available at the station.

The competence of the workers at the Odessa Aerological Station has made it possible for the station to occupy second place in the aerological net of the Ukrainian SSR in the first six months of 1958 and first place in the Soviet Union in the second half of 1958. ("Experience of Work at the Odessa Aerological Station," by S. D. Artemenko and I. N. Nikolich, Meteorologiya i Gidrologiya, No. 6, 1960, pp. 31-32)

Summary of a Ukrainian Article on Radar Observations of Thunderstorm Precipitation

A radar set was used for observations of the distribution of radio echoes with height in thundershowers. The radar receiver was calibrated in such a way that the plan position indicator corresponded to the values of sensitivity. Observations were made of showers situated at distances up to 35 km from the radar set at various heights which were determined by the elevation of the antenna.

A series of photographs was made at each altitude at different gradations of the sensitivity of the receiver. On the basis of these series of photographs vertical cross sections of the showers were drawn on the basis of the values for reflectivity in a plane perpendicular to the direction from the radar set to the center of the shower.

Observations made in the summer of 1958 show that in the central parts of thundershowers there is a decrease in reflectivity from the maximum values by at least 3 to 5 times on descending to the earth's surface. Such a sharp change in reflectivity with height is not observed in the peripheral parts of thunderstorm precipitation. The results of the present observations are in agreement with results derived at an earlier date by other radar methods.

To discover the physical processes which can lead to a change in reflectivity by 3 to 5 times with height in the central parts of thunderstorm showers we studied evaporation and the break-up of drops, the accumulation of drops at some level under the influence of rising currents, and the thawing of large ice particles (graupel, hail). As a result it was established that the evaporation of drops during falling only leads to a relatively small change in their sizes and cannot be the explanation for the observed change in reflectivity with height.

Rising air currents can separate drops by height; this can lead to the accumulation of a great number of drops at certain heights. However, in this case it would be necessary to assume that in the regions of maximum change of reflectivity with height the rain at the earth's surface should be light. This conclusion contradicts the results of observations which indicate maximum intensity of precipitation in regions of maximum change in reflectivity.

Computations show that the break-up of drops can to some degree cause the observed change of reflectivity with height. However, since these computations were made on the assumption that all water passes through the stage of break-up, which is improbable, the received values are apparently too high. Consequently, we may assume that the process of breaking-up of drops in itself is insufficient to explain the observed distribution of reflectivity with height in thunderstorm showers.

From an examination of the thawing of even relatively small hailstones (diameter 1 cm) we find that it can quantitatively fully explain the observed change in reflectivity with height in thunderstorm showers. Therefore the authors conclude that the principal processes causing a considerable change in reflectivity with height in thunderstorm showers are the thawing of large particles of ice and the break-up of drops which in falling have attained their maximum sizes. ("The Structure of Thunderstorm Showers Based on Data on the Distribution of the Intensity of Radioechoes with Height," by L. M. Markovich and V. M. Muchnik, Ukrains'kiy Fizichniy Zhurnal, Vol. 5, No. 5, p. 268)

"Vityaz'" Researchers Contribute to Understanding of Pacific Climatology

A 4-page article, written by M. Ye. Lyakhov of the Institute of Geography of the Academy of Sciences of the USSR, discusses the author's observations and conclusions in respect to the regional climatology of the parts of the Pacific traversed by the research vessel "Vityaz'."

The central part of the Pacific, he points out, is divided into two subtropical zones (one in the Northern and one in the Southern Hemisphere), two tropical, two subequatorial and one equatorial zone. The tropical belt is divided into two parts: that with variable winds and that of the trades. In the subequatorial zone there is an area with a moist climate all year and an area with a moister summer. The equatorial and subtropical zones within the limits of the region studied have not been subdivided climatically. In general these zones are oriented east-west. This is due to the amount of solar heat received and the general radiation balance of the earth's surface. Within the region investigated the radiation balance is positive (Lyakhov devotes several paragraphs to the radiation balance and total radiation of the region studied; he supplies no maps, graphs or tables to support his paper).

In respect to radiation and temperature conditions, he continues, there is a considerable difference between the zone of subtropical climate on the one hand and the belt of tropical, subequatorial and equatorial climates on the other. In climatic respects the tropical belt is by no means homogeneous and is subdivided; the boundaries deviate in many places from their general east-west orientation. The author spends several paragraphs in giving the rather classic explanations for this.

In the tropical zone, where the maps show trades, the Vityaz' at longitude 174° W found that westerly winds were dominant; these, of course, are opposite or nearly opposite to the direction of the trades. Lyakhov accounts for this phenomenon and spends some time in discussing the seasonal characteristics, statistical recurrence, and areal occurrence of westerly winds in the study area. The author feels that the question of the existence of a more or less constant westerly air flow along the equator is still unanswered and merits further investigation (this paper by Lyakhov represents an important contribution, although scarcely a definitive one, to the literature on this subject).

In the region of the trades a trade-wind inversion was discovered. Its lower boundary was situated at a height of 1 to 2 km above the surface of the ocean; this represents a confirmation of other observations rather than a new discovery.

After discussing the cloud cover and cloud types associated with this inversion, there is mention of "breaks" in this inversion, with the observation that they occur for the most part over islands or near them. This is followed by a discussion of the reasons for the decrease in precipitation in the trade-wind zone.

A number of paragraphs are devoted to a discussion of the intertropical zone of convergence. Its most northerly position is in August when its axis passes approximately along 10° N. It occupies its extreme southerly position in February. Between 173° E and 174° W the axis of the intertropical zone of convergence is approximately along 15° S (in February). But to the east of 150° W it is situated in the Northern Hemisphere throughout the year.

The author notes in conclusion that the activity of the intertropical zone of convergence is the principal climate-forming process in the general circulation of the atmosphere in the zones of subequatorial and equatorial climates. As a result of this activity there is an exchange of air masses between the two hemispheres. ("On the Characteristics of the Climatic Zones of the Central Part of the Pacific Ocean," by M. Ye. Lyakhov, Izvestiya Akademii Nauk SSSR, Seriya Geograficheskaya, No. 3, 1960, pp. 71-74)

II. GEOMAGNETISM

On the Geomagnetic Effect of the Explosion of the Tunguska Meteorite

The following is a full translation of a Russian article on still another aspect of the Tunguska meteorite:

The authors have made an attempt to explain the influence on the geomagnetic field of the flight of the Tunguska meteorite of 1908. At our request copies of magnetograms for the period 25 June-5 July 1908 were kindly sent to us by observatories and geophysical stations in Mexico City, Cairo, Dublin, Madagascar, Coimbra, Urbanovo (Czechoslovakia), Kew and Falmouth (England), and by the Danish Meteorological Service, the Institute of Geophysics in Paris, and the Irkutsk Magnetic Observatory.

According to the data of the Irkutsk Observatory, the magnetic field on 29 June 1908 was slightly disturbed; however, during a 6 to 7 hour period directly preceding the falling of the meteorite it was almost calm. At 0024 hours mean Greenwich time, 7 minutes after the explosion, seismic data show that the horizontal component increased in a sudden jump to 4.4 γ ($1 \gamma = 10^{-5}$ e); it then continued to increase and in 18 minutes increased by 20 γ more, remaining at approximately this same level for the following 14 minutes. At 0056 hours a decrease of H set in, continuing until 0145 hours. In this period the horizontal component of the geomagnetic field decreased by 67 γ. There was then a gradual return to its normal level, continuing for several hours.

The change in the vertical component of the geomagnetic field Z in this same period bears the character of a negative bay. The bay-like disturbance continued from 0024 hours to 0200 hours. The maximum decrease of Z in this period was observed to be 25.5 γ in respect to the normal, undisturbed value.

No changes in the behavior of magnetic declination were noted during this period.

The above-mentioned numerical data pertaining to the geomagnetic field are close to the data given by K. G. Ivanov (1).

On the basis of what has been said above, it may be assumed that the explosion of the meteorite caused an unusual disturbance of the geomagnetic field, in part similar to a magnetic storm with sudden onset but of exceptionally short duration.

An analysis of the magnetograms of other observatories has shown that they reflect no changes. This indicates that the magnetic disturbance caused by the Tunguska meteorite was reflected in a relatively limited area with a radius of no less than 950 km (Irkutsk) and no more than 6,000 km (Urbanovo). The latter figure requires substantial refinement.

We at once notice the similarity of the effects in the geomagnetic field after the explosion of the Tunguska meteorite and the high-level nuclear explosions which took place on 1 and 12 August 1958 over the Pacific Ocean, near Johnston Atoll (2). At the magnetic stations situated close to the atoll -- Honolulu, Palmer, Fanning, Jervis and Apia -- 1,300 to 3,000 km away, there was noted a disturbance of the geomagnetic field immediately after the explosions. At these stations magnetic declination may be regarded as the H component), immediately after the explosion, marked by a bright flash, increased by 10 to 15 γ in a sudden jump, then more slowly for a period of 13 minutes, increasing by 20-35 γ. After this there was a rather rapid increase of X by 40 to 50 γ for a period of 10 to 20 minutes with a subsequent slow (about 2-hour) return to the normal level.

In the future the authors hope to undertake an attempt to explain the effects mentioned above.

The analogy between the Tunguska catastrophe and the high-level explosions of nuclear bombs in the Pacific Ocean in 1958 is not exhausted by mention of measurements of the geomagnetic field. In both cases there was observed an anomalous intensification of air glow, having some similarity with an aurora. However, both the scale and the duration of this glow in the two cases are incommensurable.

In conclusion the authors wish to express their deep gratitude to all their colleagues at other geophysical institutions who made available necessary data. ("On the Geomagnetic Effect of the Explosion of the Tunguska Meteorite" by G. F. Plekhanov, A. F. Kovaloskiy, V. K. Shuralov and N. V. Vasil'yeo, Priroda (?), pp. 236-237)

Literature

(1) Ivancv, K. G., Geomagnetic Phenomena Observed at the Irkutsk Magnetic Observatory Due to the Explosion of the Tunguska Meteorite, 1960 (in manuscript).

(2) Matsushita, S., Journal of Geophysical Research, Vol. 64, No. 9, p. 1149, 1959.

III. OCEANOGRAPHY

New Type of Wave Graph Tested Near Sochi

A new instrument is being tested in the open sea not far from the port of Sochi; it was developed by associates of the New Technology Laboratory of the Arctic and Antarctic Scientific Research Institute (AANII). This AANII wave graph is designed for the measurement and recording of forms of waves. It is equipped with a short-wave radio transmitter which transmits signals about the shapes and amplitudes of waves to a special receiving apparatus installed on shore.

The data transmitted by the instruments considerably facilitate the research and exploration usually conducted before the construction of engineering works offshore. ("Sea Waves Recorded by Instrument," Ekonomicheskaya Gazeta, 29 June 1960, p. 4)

Description of the Soviet Wave Graph GM-16

A recently received issue of Meteorologiya i Gidrologiya contains a 1,300 word article describing the newly developed GM-16 wave graph, now in standard production after successful tests at sea, especially in the Caspian and aboard the Antarctic research vessel "Ob'."

The GM-16 is an electric, remote-control instrument designed for the recording of the heights and periods of waves; it may be used by ships that are at anchor or are slowly drifting.

The wave graph has the following principal units: a) a pressure receiver with comparator; b) a floater; c) a control panel; d) a recorder -- a high-speed automatic potentiometer; e) a hand reel with 400 m of cable.

Use of this instrument shows that it can be used for the measurement of waves from a vessel under severe oceanic conditions. The principal difficulties have been in the lowering of the apparatus from shipboard and in lifting it back aboard and the snapping of the cable. Recommandations are made to facilitate the lowering and raising of the unit and for preventing the breaking of the cable. ("Work Experience with the GM-16 Wave Graph," by V. A. Lyubanskiy and V. G. Mertsalov, Meteorologiya i Gidrologiya, No. 6, 1960, pp. 32-34)

Instruments for the Measurement of the Velocity and Direction of Marine Currents

The June 1960 issue of Meteorologiya i Gidrologiya contains a 3-page article devoted to several instruments used by Soviet researchers for the measurement of the speed and direction of marine currents from shore; the article is accompanied by diagrams of the instruments. The formulae used in this method are also provided. ("The Measurement of the Direction and Velocity of Marine Currents from Shore," by M. P. Chernyshev, Meteorologiya i Gidrologiya, No. 6, 1960, pp. 35-37)

Soviet Oceanographic Ship in Monaco

The Soviet oceanographic ship, the Academician S. Vavilov, has been tied up at Monaco since 4 July after a 15-day voyage from Odessa. The Soviet laboratory ship had telegraphed the Monaco Oceanographic Museum announcing its arrival and its desire to exchange information with Commander Cousteau and the crew of the Calypso. ("Soviet Oceanographic Ship in Monaco," Marseille, La Marseillaise, 6 July 1960, p. 1)

IV. SEISMOLOGY

Seismic Data Reveal Nature of the Earth's Crust Under the Black Sea

An article in a Russian periodical discloses that the Black Sea Experimental Scientific Research Station of the Institute of Oceanology of the Academy of Sciences of the USSR conducted regional seismic research in the Black Sea in 1957-1958 to the southwest, south and southeast of the Crimean Peninsula for the purpose of studying the structure of the Earth's surface. Ten profiles with a total length of about 1,000 km were processed.

The profiles, passing into the deep depression of the sea, reveal a relatively simple structure of the Earth's crust. Below the floor of the sea there is a thick layer with a mean velocity of propagation of seismic waves of about 3.0 km/sec; the researchers attributed this to sedimentary rocks of a sandy-clayey complex. The thickness of this layer to the southwest of Crimea is 9-14 km, while in the central part of the depression it is 8-12 km. The sedimentary layers are underlain by a layer with a velocity of 6.4-6.8 km/sec; this was attributed to the basalt layer of the Earth's crust. The thickness of the basalt layer in the investigated part of the deep depression varies from 8 to 18 km. The thickness of the Earth's crust here (including the water layer) is 22 to 30 km. The typical granite layer was not encountered in this area.

A sketch was drawn to indicate the depth at which the basalt layer is situated in this region. This surface experiences a rise as it approaches the Crimean Peninsula. Whereas in the central part of the Black Sea the surface is situated at a depth of about 15 km, it decreases to 10 km near Crimea. In the direction of Kerch Strait the surface of the basalt layer drops down to a depth of about 20 km and the thickness of the Earth's crust increases to 35-40 km.

A comparison of the results received from seismic data and the known results of investigations of the Earth's crust of the continents and under the oceans shows that the Earth's crust under the deep depression of the Black Sea differs substantially from both the continental and oceanic types of crust. ("The Deep Structure of the Earth's Crust Under the Black Sea on the Basis of Seismic Data," by Yu. P. Neprochnov, Byulleten' Moskovskogo Obshchestva Ispytateley Prirody, Otdel Geologicheskiy, No. 1, 1960, pp. 119-120)

V. ARCTIC AND ANTARCTIC

Moskalenko Given Award for Arctic Flight Operations

CPYRGHT

The Board of the Main Administration of the Civil Air Fleet has given the award of Commander of Aviation Detachment to Comrade Moskalenko for the aerial supplying and servicing of the high-latitude expedition "Sever-12."

The aviation detachment of the polar aviation service replaced the personnel at the drift station "SP-8," found an ice field for a new drift station "SP-9," and landed on that floe both personnel and everything they need for their life and work there. The aviators were also charged with the conduct of a series of geographic and oceanographic observations; they set out automatic radiometeorological stations in the Central Polar Basin.

The staff of the aviation detachment of the expedition "Sever-12" worked in a harmonious and well-coordinated manner and completed all assigned missions in the time allotted and without mishaps.

During the course of the expedition hundreds of tons of various kinds of freight and many passengers were transported by aircraft. A turboprop aircraft -- the AI-10 -- (in its freight-carrying version) was used for the first time; it repeatedly landed at the drift station "SP-8."

For the excellent accomplishment of their respective missions Colonel-General of Aviation Loginov, Chief of the Main Administration of the Civil Air Fleet, awarded 15 detachment members the medal of "Excellent Worker of the Air Fleet," the Diploma of the Air Fleet to 49 other men, and valuable presents to 5 others. Among those receiving awards were Commander of Aviation Detachment Moskalenko and the airmen Vasil'yev, Bardyshev, Utyashev, Maslov, Serdyuk, Sokolov, Mal'kov, Il'in, Yefimov, Pitonov, and others. ("For Flights in the Arctic," Sovetskaya Aviatsiya, 8 July 1960, p. 4)

"Severnyy Polyus-8" Supplied by Air

CPYRGHT

CPYRGHT

"An aircraft of the polar aviation service landed at the drift station 'Severnyy Polyus-8' on 11 July after a long period of inactivity at that airdrome. The plane was piloted by the airman Ivanov. He delivered letters, newspapers, magazines, movie films, fresh fruit and other articles to the men stationed there. Before making this flight the plane had visited the polar specialists on the drift station 'SP-9.'" ("Flight to the Drift Station," Sovetskaya Aviatsiya, 13 July 1960, p. 4)

Reports from Antarctic Stations

The following information was supplied to the Informatsionnyy Byulleten' of the Soviet Antarctic Expedition (No. 12) by A. G. Dralkin, Chief of the Fourth Continental Expedition; the reports cover the month of June 1959:

Mirnyy Observatory:

Aerometeorological work: In June the mean values at the earth's surface were: atmospheric pressure 987.2 mb; air temperature - 15°; wind velocity 14.4 m/sec; relative humidity 80%. Over-all cloud cover was 5.2. The average height reached by radiosondes was 16,260 m. During the course of the month air temperature varied from - 3.8° to - 27.4°. There were 27 days with snow storms; precipitation totaled 67 mm. A total of 56,468 tons of snow were transported along a 1 km-long, 3.5 m-high shore line during the period 20 to 30 June.

Zonal circulation predominated in June in the Indian Ocean sector of Antarctica. In the beginning of the first and in the course of the second 10-day period low atmospheric pressure was noted in the vicinity of Mirnyy; this was caused by the filling of the cyclones which approached the coast. An easterly wind prevailed in the troposphere. Westerly jet streams periodically appeared in the lower stratosphere; this was evidence of the movement of cyclones from west to east along the northern periphery of the coastal cold low. In the second 10-day period a powerful anticyclone formed in the subtropical zone; its central part was situated in Mackenzie Gulf. A stable southerly jet stream was observed in the troposphere and lower stratosphere with a wind velocity greater than 70 m/sec. This stream, predominantly southwesterly, was caused by the southeasterly periphery of the anticyclone. The jet stream extended to the Vostok station. The tropopause rose by 6.2 km and attained an altitude of 14 km.

A compression inversion was noted in the lower troposphere in the 13 km layer; its vertical thickness varied in the range of 0.5-1 km. A near-surface inversion was also observed -- on individual days it attained 700 m.

The air temperature in the initial period of the formation of the atmosphere dropped by 8°; then, with an intensification of the wind during clear weather, there was a tendency for the temperature to rise. The mean wind velocity at this time was 20 m/sec, with individual gusts exceeding 30 m/sec. On some days the density of the transported snow was so great that visibility was zero.

Geophysical research: The magnetic field was relatively calm during the month. A small storm was noted on 11 June; some increase in activity was observed on 15-16 and 27-29 June. In comparison with May there was an especially marked decrease in activity during the daytime hours.

The ionosphere was calm. Small disturbances were noted on 11, 14 and 15 June. A period of full absorption set in on 11 June after a normal increase in critical frequencies; this continued from 0700 to 1200 hours. In the subsequent hours the F_2 layer appeared again and its development continued normally. At local noon on 14 June there began a sharp rise in minimum frequencies. Complete absorption was observed between 2000 hours on 14 June and 0000 hours on the following day. An increase in minimum frequencies was also noted on 16 June. During the entire month the F_2 layer was diffuse -- its critical frequencies did not exceed 10-11 mc. The F_1 layer was absent.

Fifty-five individual earthquakes were recorded in June; epicentral distances were determined for 11 of them. On 2 June, the most active day, 10 earthquakes were recorded; 8 of these were confirmed by the Washington bulletin.

At the end of the month there was a noticeable increase in the amount of high-frequency static; this made processing extremely difficult. This static was probably associated with the process of formation of icebergs and crevasses in the continental ice.

Glaciological research: Observations were begun of the temperature regime of the shelf ice. Thirty-five full structural analyses were made of the shelf ice.

Hydrophysical research: On 21 June the thickness of the pack ice was measured along a straight line.

Between 23 and 24 June there was a collapse of the barrier to the east of Cape Khmar; as a result a great amount of ice tumbled into the sea and several icebergs were formed. The collapse and the wave which it caused partially destroyed the shelf ice; hummocky ridges appeared which locally were over 2 m high. Blocks of bottom ice appeared on the surface in the zone of the collapse. In the period that followed there was further collapse, but to a smaller degree.

Vostok Station

In June the mean values at the Earth's surface were: atmospheric pressure 623.8 mb; air temperature - 66.3°, wind velocity 4.9 m/sec; relative humidity 73%; temperature of the snow surface - 68.7°. Overall cloudiness 4.2. Air temperature varied from - 53.7° to - 77.6°; total precipitation was 6.2 mm. A SSW wind prevailed. The average altitude reached by radiosondes was 15,801 m; the average altitude reached by pilot balloons was 15,127 m. The soundings were made in the polar night at very low temperatures. The minimum air temperature (- 84.7°) was noted at an altitude of 18,040 m (the maximum height reached by a radiosonde). During the entire month the tropopause layer was predominantly in an isothermal condition. The mean position of the lower boundary of the tropopause was 9,219 m; the mean temperature in this layer was - 68.1°.

In June three snow surveys were made in an open area. The depth of the snow cover did not change.

Glaciological observations were made in three pits. The mean temperature in the pits was as follows:

at a depth of 10 cm	- 70.0°
at a depth of 50 cm	- 65.0°
at a depth of 100 cm	- 63.9°

The Mean Density of the Snow in the Pits

	In the First Pit	In the Second Pit	In the Third Pit
at a depth of 10 cm	0.33	0.32	0.34
at a depth of 50 cm	0.33	0.35	0.35
at a depth of 100 cm	0.35	0.35	0.35

The mean density of the snow on the surface (from five samples) on 20 June was 0.32 and on 30 June it was 0.23.

The condition of the ionosphere in June was characterized by some decrease in the diffuseness of the F-layer, the almost constant presence of the night E-layer or a lag on the low-frequency end of reflection from the F-layer. Between 10 and 14 June there was a monotonous increase in absorption with a subsequent drop-off in the period 14-18 June. Maximum absorption, in which the F-value reached a minimum of 3 mc, was recorded on 14 June. At the end of the month there was a noticeable increase in the frequency of cases of the manifestation of the sporadic screening layer E, especially at the beginning and end of each day (universal time). On 29 June there were values of the critical frequency of the night layer E (more than 2 mc) which were unusual for this season of the year; ionograms showed a small total diffusivity.

Auroras were observed on 1, 2, 4, 5, 6, 7, 8, 9, 11, 12, 13, 14, and 25 June. The maximum brightness of auroras was 2 on the scale. The number of lines recorded on the frames of the spectral camera was a maximum of five.

During the month there were 14 magnetically calm days, moderately disturbed days were 12, and those with marked disturbances numbered 4. No magnetic storms were observed.

Lazarev Station

In June the mean values at the Earth's surface were: atmospheric pressure 986.4 mb; air temperature - 18.3°; relative humidity 85%; wind velocity 13.3 m/sec. The temperature of the soil surface was - 19.6°. Over-all cloudiness was 7.2. Height reached by radiosondes was 16,390 m. Air temperature varied from - 7.0° to - 36.4°. An easterly wind prevailed. There were 102.5 mm of precipitation. The snow surveys made each 10 days showed a decrease in the amount of snow by 2.1 cm.

Sixteen days with magnetic disturbances were observed in June.

Shelf ice was present to the west of the station beginning on 14 June; water was visible to the north. An iceberg calved to the north of the station on 23 June. ("By Radio from Antarctica," by A. G. Dralkin, Informatsionnyy Byulleten' Sovetskoy Antarkticheskoy Ekspeditsii, No. 12, 1959, pp. 47-49)

Abstracts of Articles from Issue 12 of the "Information Bulletin of the Soviet Antarctic Expedition

A full translation of pages 47-49 of the Information Bulletin has been reproduced above. There are ten other articles in this issue, as follows:

1. "A Brief Description of the Physical Geography in the Vicinity of the South Polar Station Lazarev," by P. S. Voronov (Scientific Research Institute of Arctic Geology) and Yu. A. Kruchinin (Arctic and Antarctic Scientific Research Institute), pp. 5-9.

The initial paragraphs of this article describe the site, geographical coordinates, elevation and buildings of the Lazarev station, followed by a description of the ice on the land and sea surrounding the base. A map shows the general location of the station and an inset shows the layout of the buildings.

Brief mention is made of the character of the nunataks, zastrugi, crevasses, and other microfeatures on the surface of the vast ice sheet. Also mentioned, but quite briefly, are the Wohlthat and Alexander Humboldt Mountains and the Schirmacher Oasis.

This article contains a few data or other mention of such observations as rock outcrops, snow accumulation, wind velocity and direction, temperatures, vegetation and animal life.

2. "Geological Exploration by the Fourth Continental Expedition in Queen Maud Land in 1959," by M. G. Ravich (Scientific Research Institute of Arctic Geology), pp. 10-13.

The author begins with a brief description of the arrangement of topographic features in Queen Maud Land. The area subjected to geological exploration was between 9°25' and 18°37' E and 71°-72° S. The ranges (block mountains) and the nearby Schirmacher Oasis are described geologically.

The article is strongest in describing the rock types of this area, including moraines. The author then emphasizes eight points which he states distinguishes this area from other parts of the crystalline basement of the East Antarctic platform.

Very little in the way of useful minerals has been found, but the author speculates on the type of finds that may be expected in the future.

3. "Principal Structural Forms of the Bottom Topography of the Davis Sea," by V. N. Mal'tsev, Hydrographic Institute of the Main Administration of the Northern Sea Route, pp. 14-16.

This article, accompanied by a map of the region studied, is based on the geomorphological research accomplished from aboard the vessels "Ob'" and "Lena" between 1955 and 1959; it describes the great structural complexity and dissection of the floor of the Davis Sea.

The author emphasizes newly available data from work aboard the "Ob'" in 1959 in the most interesting and little-known sector of the sea to the east of Drigal'skiy Island. Much attention is devoted to the 500-to-600 m deep trough that has been described (incompletely) by earlier authors.

The Fourth Continental Expedition also discovered the best approach to Mirnyy through the ice.

4. "Relief-Forming Activity of the Glacial Cover of the Eastern Coast of Antarctica," by S. A. Yevteyev (Institute of Geography of the Academy of Sciences of the USSR), pp. 17-19.

The ice sheet of Antarctica, hundreds and even thousands of meters thick, and moving at a rate of up to 1,000 m a year, is the most active force in eroding the subglacial relief of that continent. This article analyses the manner in which this erosion takes place, the subglacial relief resulting from this activity, and the glacial removal of the detritus.

5. "Jet Streams in the Atmosphere Over Mirnyy," by Prof. V. A. Bugayev (Central Institute of Weather Forecasting), pp. 20-23.

This is a brief and preliminary report on jet streams over Mirnyy in 1958. It is based on data collected by the release of radiosondes twice or four times each day during that year. The various paragraphs report on the frequency and duration of this phenomenon and the direction, velocity and the height of these winds. Table 1 is a highly valuable statistical presentation of these various indices month-by-month for a 13-month period.

It was found that in an overwhelming majority of cases the jet stream is situated near the tropopause or below it; in slightly more than 10% of the cases it was situated above the tropopause.

6. "Peculiarities of the Position of the Tropopause Over Antarctica in 1958," by P. D. Astapenko (Leningrad Hydrometeorological Institute), pp. 24-28.

There are a number of peculiarities of the tropopause over the polar plateau that escape notice and analysis when we only use maps of its mean position. Among these peculiarities there are cases of the "disappearance" and "break-down" of the tropopause.

The "disappearance" phenomenon occurs from time to time beginning at the end of May and occurring throughout the winter and early spring months. Both these phenomena are briefly discussed and possible explanations are offered.

7. "On the Study of the Water and Heat Balance of Drake Strait," by L. I. Yeskin (Arctic and Antarctic Scientific Research Institute), pp. 29-32.

Two hydrological cross sections were made in Drake Strait in 1958 -- a western, from South America to the edge of the ice, and an eastern -- from South America to the South Shetland Islands.

The general movement of water in the strait is from west to east. There are three currents within the strait. These currents are described in respect to their seasonality, depth, velocity, temperature, etc. Figure 1 shows the location of the stations; Figure 2 is a diagram of the currents in cross section. The author concludes that the movement of water and heat through Davis Strait into the Atlantic sector of the Antarctic Ocean is rather great; statistical support for this conclusion is given in Table 1.

8. "Some Peculiarities of the Generation of Short-Period Variations of the Earth's Electromagnetic Field in Antarctica," by V. A. Troitskaya (Institute of Physics of the Earth), pp. 33-36.

Until now there has been no data available on which to base an understanding of the generation of short-period variations of the Earth's electromagnetic field in the polar regions, especially in Antarctica. Data collected in 1957 have shown that the amplitude of short-period variations in Antarctica, in great contrast to the middle latitudes, is in the category of tens and hundreds of millivolts per kilometer.

The most interesting of the discoveries yet made are: 1) the clear effect of the influence of the polar night on the generation of stable variations and 2) the relationship of the character of the simultaneous generation of stable variations in the Northern and Southern Hemispheres in respect to season. These two matters are discussed in some detail. These discoveries make it possible to reapproach the problem of the generation of variations on a planetary scale and will doubtless eliminate certain contradictions in our present concepts of the processes of generation of short-period variations.

9. "Principal Results of a Small-Scale Aeromagnetic Survey to the South of the Shackleton Ice Shelf," by Yu. S. Glebovskiy (Leningrad Branch of the All-Union Scientific Research Institute of Geophysics), pp. 37-40.

An aeromagnetic survey was made in February-March 1957 in a region situated to the south of the Shackleton Ice Shelf. The entire sector (see sketch map) was surveyed at a scale of 1:1,000,000. The error in small-scale aeromagnetic measurements was approximately $\pm 75\ \gamma$.

The resulting map, with isolines for ΔT, shows three large anomalous zones; these zones are described and explanations given for their anomalous characteristics.

10. "On the Age of Rocks in Eastern Antarctica," by Ye. S. Korotkevich (Arctic and Antarctic Scientific Research Institute) and B. V. Timofeyev (All-Union Petroleum Geological Exploration Scientific Research Institute), pp. 41-46.

This article summarizes the findings of spore analysis of specimens of morainal material and bedrock collected during the First Continental Expedition. Table 1 shows the micropaleophytological characteristics of ancient sedimentary strata in Eastern Antarctica (Mount Sandow, Vestfold Oasis and Burr Bay). Figure 2 is a sketch map of the distribution of ancient sedimentary rocks. The author draws some tentative conclusions in respect to the age of the rocks. The spore analysis has confirmed previous estimates that a large part of the boulder material is of Upper-Proterozoic age, it appears that the upper horizons of the strata from which the morainal material was formed should be ascribed to the Lower-Cambrian. The sediments of Mount Sandow are also evidently of Lower-Cambrian age, not Upper-Proterozoic, as represented earlier. (Information Bulletin of the Soviet Antarctic Expedition, No. 12, 1959, pp. 5-46)

Helicopter Rescue of a Native on the Coast of the Barents Sea -- A TASS Report

An alarming radio message was recently received at the okrug center of Nar'yan-Mar from the coastal area of the Barents Sea where collectivized herds of reindeer are now being grazed. The radio message reported that a 75-year old Nenets herdsman named Afanasiy Alekseyevich Tuleyev had suffered a severe trauma and was in need of urgent surgical treatment. Within several minutes an "MI-1" helicopter rose into the air; it was piloted by the Komsomolets Yuriy Naumov. It was no easy matter to find an isolated reindeer herder's tent on that long coastline. The first flight was unproductive. After replenishing its fuel supply the helicopter again rose into the air. Finally the aircraft commander spotted a group of people near the gulf. Yu. Naumov successfully landed the machine on a sand shoal. After taking the herder aboard, the helicopter headed for Nar'yan-Mar. The Nenets raindeer herder was rendered timely medical assistance. He is now recuperating and will soon return to his native collective farm. ("A Helicopter Flies into the Tundra," Sovetskaya Aviatsiya, 8 July 1960, p. 4)

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